PRC Environmental Management, Inc
1021 Rohlwing Road
Suite D
Rolling Meadows, IL 60008
708-255-4166
Fax 708-255-8528

PRC

January 22, 1993

Mr. Robert Lance
Work Assignment Manager
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604

Re: Contract No. 68-W9-0006, Work Assignment No. C05017
Draft Feasibility Study Review Comments
Blackwell Landfill Site, Warrenville, Illinois

Dear Mr. Lance:

PRC Environmental Management, Inc. (PRC), is enclosing technical review comments on the Draft Feasibility Study (FS), Blackwell Landfill NPL Site, December 1992, which was prepared for the Forest Preserve District by Warzyn Inc. PRC was tasked to provide technical oversight support to the U.S. Environmental Protection Agency (EPA) under the above-referenced contract and work assignment. Part of the work assignment was to review this FS. PRC reviewed the FS for technical adequacy; for compliance with the Administrative Order on Consent, including the Statement of Work and the EPA-approved remedial investigation/feasibility study (RI/FS) Work Plan, and relevant EPA regulations (National Contingency Plan, 40 CFR Part 300, Subpart E), policy, and guidance; and to ensure that conclusions were adequately supported. PRC's review comments consist of general comments followed by specific comments.

PRC found the FS to be deficient in several fundamental areas. The FS states that the site poses no unacceptable risk currently or in the future. Several important elements of future risk, such as the potential for increased ground-water contamination and contaminant migration, were not properly characterized. The FS does not address the ground-water pathway in accordance with EPA's ground-water policy and does not provide adequate justification for the proposed ground-water remedy of natural attenuation and monitoring. Finally, the FS did not evaluate an adequate range of alternatives.

Please call me at (312) 856-8759 if you have any questions about PRC's review.

Sincerely,

Gerald A. McLane
Contractor Project Manager

Enclosure

cc: Eva Howard, EPA (letter only)
Ed Schuessler, PRC (letter only)
Therese Gioia, PRC

REVIEW COMMENTS ON THE DRAFT FEASIBILITY STUDY FOR THE BLACKWELL LANDFILL SITE DUPAGE COUNTY, ILLINOIS DECEMBER 1993

PRC found the FS to be deficient in several fundamental areas. The FS states that the site poses no unacceptable risk currently or in the future. Several important elements of future risk, such as the potential for increased ground-water contamination and contaminant migration, were not properly characterized. The FS does not address the ground-water pathway in accordance with EPA's ground-water policy and does not provide adequate justification for the proposed ground-water remedy of natural attenuation and monitoring. Finally, the FS did not evaluate an adequate range of alternatives.

GENERAL COMMENTS

1. The draft feasibility study (FS) does not adequately explain the risks associated with the no action alternative. The FS states that no action poses no unacceptable risk to human health, welfare, or the environment (that is, greater than 1-06 carcinogenic risk and greater than a hazard index of 1.0 for noncarcinogenic risk). The FS goes on to evaluate six other action alternatives that would reduce what is already defined as acceptable risk. If the no action alternative truly poses no unacceptable risks, no other alternatives need to be evaluated. However, the no action alternative fails to address future risks associated with (1) continued ground-water contamination, (2) continued and increased leachate generation as the current cap erodes and otherwise decreases in effectiveness because of lack of proper maintenance and repair, and (3) failure of the existing passive venting system because of lack of maintenance and repair. When these items are adequately addressed, the no action alternative may pose future unacceptable risks, making the evaluation of action alternatives necessary. The future risks associated with the no action alternative should be revised to address the three items identified above.

2. The FS does not adequately address the ground-water pathway. The FS does not address the U.S. Environmental Protection Agency's (EPA) ground-water policy to return usable ground waters to their beneficial uses within a reasonable time frame. The Superfund program uses the ground-water classification scheme in EPA's Ground-Water Protection Strategy. The cleanup levels to be achieved in ground water are based on aquifer classification. The FS should be revised to address EPA's ground-water policy. Ground water should be evaluated to address the following issues: (1) area of attainment and (2) restoration time frame, including technical limits to extracting contaminants, feasibility of providing an alternate water supply, the potential use and value of the ground water, the effectiveness and reliability of institutional controls, and the ability to monitor and control contaminant movement.

   The FS does not present sufficient justification for proposing natural attenuation as the ground-water remedy because it does not discuss the area of attainment or restoration time frame. Natural attenuation should be recommended only when (1) active restoration is not practicable, cost-effective, or warranted because of site-specific conditions or (2) natural attenuation is expected to reduce the concentrations of contaminants in the ground water to the remediation goals in a reasonable time. The FS must show that biodegradation, dispersion, dilution, and adsorption will effectively reduce contaminants in the ground water to concentrations protective of human health as quickly as could active restoration. The FS should be revised to present more information supporting the proposal for natural attenuation of ground-water contamination.

3. The FS proposes ground-water monitoring and natural attenuation as the remedy for the ground-water pathway. The FS should also propose contingent actions to be taken if ground-water monitoring indicates that contaminant levels are increasing or that migration beyond the current affected area is occurring due to increased migration of leachate from the landfill. The FS should also describe the contaminant levels or increase in migration that would trigger further investigation and potential remedial action.

4. The FS proposes a leachate study as part of the leachate extraction and treatment option. According to the FS, the leachate study would determine the most appropriate system for leachate extraction and treatment. Ideally, the leachate study suggested as part of the option should be conducted as a treatability study during the remedial investigation and feasibility (RI/FS). It is EPA policy to conduct treatability studies as soon as the need is identified. Task 8 of the Statement of Work for the Administrative Order on Consent and Section 8.1.4.2 of the EPA-approved RI/FS Work Plan provide for supplemental field or treatability studies during the RI/FS. Conducting the leachate treatability during the RI/FS would reduce the uncertainties associated with the leachate component's extraction and treatment process, effluent discharge options, and cost.

5. The FS does not apply the overall protection of human health and the environment criterion properly. This is a threshold criterion that is either met or not met; protectiveness is not measured in degrees. The FS should be revised to specify how each alternative protects human health and the environment without describing one alternative as more or less protective than another.

6. The action alternatives proposed in the FS do not represent an adequate range of options for remedy selection, especially with regard to source (landfill) control through adequate capping. The only capping process option examined is repair of the existing cap. Resource Conservation and Recovery Act (RCRA) Subtitle D and Subtitle C capping options are eliminated from consideration without adequate justification. The Hydrologic Evaluation of Landfill Performance (HELP) model should be used to show the reduction in infiltration (and in subsequent leachate generation) achieved through repairing the existing cap and installing RCRA Subtitle D and Subtitle C caps. Without a comparison of the infiltration rates associated with the three capping options, it is difficult to adequately evaluate them.

   General comments (GC) 7 through 13 provide suggestions for reorganizing the technologies and process options already identified in the FS (with the addition of Subtitle D and Subtitle C capping options) into a set of new alternatives.

7. Alternative 2 is a limited action alternative that proposes monitoring and continued passive landfill gas venting. Alternative 2 does not address the existing landfill cap, which at a minimum should be repaired to meet State of Illinois minimum landfill cover requirements. Alternative 2 should be revised to include repair of the existing landfill cap. Proposed Alternative 5 should become the new limited action alternative.

8. Alternative 3 proposes monitoring and active landfill gas extraction and treatment. Active landfill gas extraction and treatment are proposed even though the existing passive venting system is said to be adequate and does not pose an unacceptable risk to human health and the environment. If this is true, an active landfill gas extraction and treatment system would appear to be necessary only if the landfill cap were significantly improved (with Subtitle D and Subtitle C caps), thereby limiting migration from the landfill. Alternative 3 does not provide significant improvement to the landfill cap. Alternative 3 as proposed should be eliminated.

9. Alternative 4 is not adequate and should be eliminated. It does not address minimum landfill capping requirements, and it proposes leachate extraction and treatment without reduction of leachate generation through improvement to the landfill cap. Alternative 4 should be revised to include, at a minimum, repair of the existing landfill cap. Proposed Alternative 6 should become the new Alternative 3.

10. A new Alternative 4 (including monitoring, a Subtitle D cap, and active landfill gas extraction and treatment, if necessary) should be added and evaluated.

11. A new Alternative 5 (including monitoring, a Subtitle C cap, and active landfill gas extraction and treatment, if necessary) should be added and evaluated.

12. Proposed Alternative 7 is the same as proposed Alternative 6 with the addition of active landfill gas extraction and treatment. Without significant improvement to the landfill cap, active landfill gas extraction and treatment are not necessary. Proposed Alternative 7 as it is written should be eliminated. New Alternatives 6 and 7 should be added and evaluated as explained in GC 13.

13. The new alternatives should be as follows:

- Alternative 1: No Action
- Alternative 2: Monitoring, Existing Cap Repair, and Passive Landfill Gas Venting
- Alternative 3: Monitoring, Existing Cap Repair, Leachate Extraction and Treatment, and Passive Landfill Gas Venting
- Alternative 4: Monitoring, Subtitle D Cap, Active Landfill Gas Extraction, if necessary, or Passive Landfill Gas Venting
- Alternative 5: Monitoring, Subtitle C Cap, Active Landfill Gas Extraction and Treatment, if necessary, or Passive Landfill Gas Venting
- Alternative 6: Monitoring, Subtitle D Cap, Leachate Extraction and Treatment, Active Landfill Gas Extraction, if necessary, or Passive Landfill Gas Venting
- Alternative 7: Monitoring, Subtitle C Cap, Leachate Extraction and Treatment, Active Landfill Gas Extraction and Treatment, if necessary, or Passive Landfill Gas Venting

14. As a matter of convention, most FS are organized so that alternatives are evaluated from no action to the alternative involving the greatest degree of treatment. This FS should be reorganized so that alternatives are evaluated in a more logical order.

15. The FS states that deed restrictions are not necessary because the Forest Preserve District (FPD) lacks the authority or power to sell the property. The fact that FPD cannot sell the property doesn't mean the property cannot be sold. Apparently, the state legislature has the authority to sell the property. Deed restrictions should be imposed so that the state legislature does not unknowingly sell the property without appropriate stipulations for its use. The FS should be revised to include deed restrictions as an institutional control.

16. The FS was changed significantly from the alternatives array document, which basically covers the FS through development and screening of alternatives. Alternatives in the

alternatives array document were changed in the FS, and several process options were eliminated, including Subtitle D and Subtitle C caps and filling in Sand Pond, which is located just south of the landfill. The FS contains no explanation for these changes. The potentially responsible party (PRP) should explain why such significant changes were made.

SPECIFIC COMMENTS

1. Executive Summary, Page ES-6, Ground-Water Remedial Action Objective. The first remedial action objective for ground water is to prevent off-site migration of contaminants at concentrations above maximum contaminant levels (MCL). Ground-water remedial action objectives should address the area of attainment over which cleanup levels will be achieved in the ground water and the restoration time frame for cleanup of the ground water to selected cleanup levels. The existing plume should not be allowed to migrate beyond its current limit, and restoration of ground water contaminated above MCLs should be addressed. This objective should be revised to address migration beyond the currently affected area, and an objective should be added to address ground-water restoration. Refer to GC 2.

2. Executive Summary, Page ES-7, Leachate Remedial Action Objectives. The first remedial action objective for leachate is to repair the landfill cap so as to promote positive drainage in order to reduce infiltration and leachate generation. This objective presumes that the remedy will include cap repair rather than cap replacement. The objective should be revised to eliminate the reference to cap repair. The objective of promoting positive drainage and reducing infiltration should be stated without regard to a particular remedy.

3. Executive Summary, Page ES-7, Leachate Process Options. The list of leachate process options retained for further evaluation should include a Subtitle D landfill cap and a Subtitle C landfill cap.

4. Executive Summary, Page ES-8, Development and Screening of Remedial Alternatives. The alternatives listed should be revised in accordance with GCs 7 through 13.

5. Executive Summary, Page ES-8, Detailed Analysis of Alternatives. This section of the Executive Summary should summarize the results of the detailed analysis conducted in the FS rather than just describe the alternatives. The descriptions and evaluations should be revised based on the new list of alternatives.

6. Executive Summary, Page ES-9, Alternative 1 - No Action. This paragraph should be revised in accordance with GC 1.

7. Executive Summary, Page ES-10, Ground-Water Paragraph. This paragraph states that the results of the RI show that ground-water contamination is stabilized and limited to the FPD property. However, the RI shows that contamination is not limited to the FPD property. Several private wells downgradient from the site show low levels of contamination. The incorrect statement should be revised; the ground-water contamination should be viewed in light of the EPA ground-water policy and not the current location of the contaminant plume. Refer to GC 2.

8. Executive Summary, Page ES-21, Comparison of Alternatives. This section explains the purpose of the comparative analysis. This section should also summarize the results of the comparative analysis.

9. Section 3.3, Page 3-8, Baseline Risk Assessment. This section states that the site poses no risk to human health and the environment based on the baseline risk assessment. If the site poses no risk, then no action is appropriate and this FS is not necessary. The no action alternative fails to address the future risks associated with (1) potential migration of ground-water contamination, (2) erosion of the existing landfill cover, (3) potential landfill gas migration when the existing passive vents no longer operate effectively because of lack of repair and maintenance, and (4) potential development by the FPD to improve facilities at the preserve. These risks should be carefully evaluated to determine whether the findings of the baseline risk assessment are correct. The baseline risk assessment and this FS should be revised if future risks are identified.

10. Section 4.1, Page 4-1, Media of Concern. This section discusses the media of concern at the site. This section states that the baseline risk assessment determined that the site poses no unacceptable risk. The section then describes the media of concern. The baseline risk assessment should be revised to fully identify future risks. Those future risks should then be explained in this FS, and will serve as the basis for the remedy.

11. Section 4.2, Page 4-3, Development of Remedial Action Objectives. In accordance with the RI/FS Work Plan, remedial action objectives should address contaminants of concern, exposure routes, receptors, and acceptable levels of contaminants. The remedial action objectives in the FS should be revised to specifically address these items.

12. Section 4.2.1, Page 4-3, Ground Water. The ground-water remedial action objectives should be revised in accordance with specific comment (SC) 1.

13. Section 4.2.2, Page 4-3, Leachate. The leachate remedial action objectives should be revised in accordance with SC 2.

14. Section 4.3.1, Page 4-4, Ground-Water General Response Actions. This section summarizes the general response actions for ground water. The ground-water general response actions are separated into two groups: Group I actions involve no or limited action, and Group II actions involve active restoration of the ground water. The FS carries forward only Group I actions and reserves evaluation of Group II actions for later, if necessary. The artificial creation of Group I and II actions serves no real purpose for the FS. Group II actions should be evaluated in this FS as contingent actions in case ground-water monitoring shows increased levels of contamination or migration (that is, failure of natural attenuation). Refer to GC 3.

15. Section 4.3.2, Page 4-5, Leachate General Response Actions. This section lists the general response actions considered to address leachate. The list includes "leachate use restrictions." Use restrictions usually refer to limiting the use of something that is presently used for a purpose. The "leachate use restrictions" should be changed to "access restrictions."

16. Section 4.4.1, Page 4-6, Ground-Water Volumes/Areas. This section discusses the ground-water contamination associated with the site. This discussion should be revised to address the issues discussed in GCs 2 and 3.

17. Section 4.4.2, Page 4-7, Leachate Volumes. This section discusses the estimated volume of leachate currently in the landfill. Based on the HELP model, the text should also discuss the volume of leachate that will continue to be generated. The text should also note that leachate volumes may be underestimated because the 25 percent porosity estimate may be too low.

18. Section 4.5.1, Page 4-9, Screening Ground-Water Technologies. This section discusses identification and screening of ground-water technologies. The discussion of Group II

general response actions and technologies should be revised in accordance with GCs 2 and 3. In addition, the discussion of ground-water use restrictions should address (1) potential future migration of contamination in the outwash and bedrock aquifers and (2) the types of use restrictions available. Finally, the PRP should explain why surface water elimination as evaluated in the alternatives array document was eliminated from the FS.

19. **Table A, Pages 4-11 through 4-14.** The Group II ground-water technologies should be deleted. All technologies or actions associated with active restoration of ground water should be presented as contingencies in case of either future ground-water contaminant level increases or migration.

20. **Section 4.5.2, Page 4-14, Screening Leachate Technologies, Vertical Barriers.** This section discusses identification and screening of leachate technologies. Vertical barriers are eliminated from consideration because the leachate is not migrating beyond the filled areas. This is inaccurate and inconsistent with other statements in the FS attributing the ground-water contamination to migration of leachate. Vertical barriers should be eliminated from consideration for other reasons, such as lack of an impermeable layer to tie the vertical barriers into, but not because leachate is not migrating.

21. **Section 4.5.2, Page 4-14, Screening Leachate Technologies, Leachate Use Restriction.** This section discusses identification and screening of leachate technologies. The term "leachate use restrictions" should be changed to "access restrictions."

22. **Table B, Page 4-16, Screening Leachate Technologies.** This table summarizes identification and screening of leachate technologies. The remedial technology identified as "cap repair" should be expanded to include all capping options from repair of the existing cap to installation of a RCRA Subtitle C cap. The capping option is properly evaluated in Table 8 of the FS.

23. **Section 4.6.1, Page 4-21, Evaluation of Ground-Water Process Options.** This section describes the evaluation and selection of ground-water process options. This section should be revised to delete the discussion of the Group II options and to present all active restoration options as contingencies in case monitoring indicates ground-water contaminant level increases or migration.

24. **Section 4.6.2, Page 4-23, Evaluation of Leachate Process Options.** This section discusses evaluation of leachate process options. The justification is inadequate for eliminating all capping options from consideration except existing cap repair. The HELP model should be used to show the reduction in leachate generation if the landfill cap is upgraded to meet Subtitle D and Subtitle C requirements. This section of the FS should explicitly describe what is meant by a Subtitle D cap and a Subtitle C cap; Table 8 indicates that a synthetic membrane liner is assumed with both the Subtitle D and C caps. Refer to GC 6.

25. **Table E, Pages 4-27 and 4-28.** This table summarizes evaluation and selection of leachate process options. The solid waste type cap (Subtitle D cap) process option should be retained unless the HELP model shows that infiltration is not reduced through the use of such a cap. Also, the description of the solid waste type cap in Table E is not consistent with the description in Table 8, which indicates that a solid waste type cap would use a synthetic liner. This inconsistency should be corrected.

26. **Table E, Page 4-30.** Table E summarizes evaluation and selection of leachate process options. The table indicates that a National Pollution Discharge Elimination System (NPDES) permit is required to discharge treated leachate to a surface water body. According to the National Contingency Plan (NCP), an NPDES permit would not be needed. However, the substantive requirements of such a permit would need to be met. The table should be revised to reflect these facts.

27. **Table 9, Page 2 of 5.** Table 9 and Table E are not consistent. Table 9 eliminates the hazardous waste type cap (Subtitle C cap) from consideration, but Table E retains it. Table 9 should be revised to retain both the solid waste type cap and hazardous waste type cap process options.

28. **Table G, Page 5-2, Listing of Retained Technologies.** This table lists the technologies and process options retained for further analysis. The table should be revised to add a Subtitle D cap and a Subtitle C cap to the capping process options.

29. **Section 5.1.1, Page 5-3, Development of Ground-Water Alternatives.** This section discusses development of ground-water alternatives. The discussion of Group II general response actions should be eliminated. Group II response actions should be presented as contingencies in case monitoring shows ground-water contaminant level increases or migration.

30. **Section 5.1.2, Pages 5-4 and 5-5, Development of Leachate Alternatives.** This section discusses uncertainties associated with leachate volume, generation rate, extractability, and origin. These uncertainties need to be addressed to adequately evaluate leachate process options and alternatives. The uncertainties associated with leachate volume, generation, and migration also affect evaluation of the ground-water pathway. In accordance with Task 8 of the Statement of Work for the Administrative Order on Consent and Section 8.1.4.2 of the EPA-approved RI/FS Work Plan, treatability studies should be conducted to reduce the number of uncertainties associated with leachate. These studies are necessary to define the most appropriate system for leachate extraction and treatment and to support monitoring and natural attenuation as the remedy for the ground-water pathway. Refer to GC 4.

31. **Section 5.1.2, Page 5-5, Development of Leachate Alternatives, Paragraph 3.** This paragraph discusses the effect of leachate recovery and treatment on the reduction of toxicity, mobility, and volume criterion. This paragraph erroneously evaluates whether the toxicity, mobility, or volume of leachate is reduced by the remedy. The FS should evaluate whether the various alternatives reduce the toxicity, mobility, or volume of contaminants through treatment as is done in Section 6. This paragraph should be deleted.

32. **Section 5.2, Pages 5-6 and 5-7, Description of Remedial Action Components.** This section lists the process options retained for each component. The component "Landfill Cap Repair" should be changed to "Landfill Cap," and the Subtitle D and Subtitle C caps should be added as process options.

33. **Section 5.2.1, Page 5-7, Passive Landfill Gas Venting.** This section describes the existing venting system. The section states that there is no evidence suggesting off-site migration of gas. The text should note that although this may be true, no off-site soil gas sampling has been conducted to confirm that no migration is occurring.

34. **Section 5.2.2, Page 5-8, Active Landfill Gas Extraction and Treatment.** This section describes the proposed active landfill gas extraction and treatment system. This section should discuss generation, collection, treatment, and disposal of condensate.

35. **Section 5.2.3, Page 5-8, Leachate Extraction with Treatment.** This section describes the three phases of the proposed study to identify an appropriate system for leachate removal and treatment. As explained in GC 4 and SC 30, the leachate study should be conducted as soon as possible.

36. **Section 5.2.4, Page 5-9, Landfill Cap Repair.** This section describes the process options associated with repair of the existing clay cap. This section should be renamed "Landfill

Capping," and three process options should be described: (1) existing cap repair, (2) RCRA Subtitle D cap, and (3) RCRA Subtitle C cap. The HELP model should be used to estimate the amount of leachate generated with each process option. Refer to GC 6.

37. Section 5.2.5, Page 5-10, Monitoring. This section describes the monitoring process option. The discussion should be limited to the monitoring program under the monitoring process option being evaluated. The monitoring programs for other process options, such as leachate collection and treatment, should be discussed under each process option.

38. Section 5.2.5.1, Page 5-9, Ground-Water Monitoring. This paragraph describes the ground-water monitoring proposed for the site. The paragraph states that the results of the RI ground-water sampling programs show that ground-water contamination is limited to the FPD property. This statement is not correct. The RI reports that low-level contamination was detected in private wells downgradient from the site. This contamination (dichloroethane and dichloroethene) is presumably from the landfill, as the RI does not attribute it to sampling or laboratory error. The text should be revised to correct the erroneous statement.

39. Section 5.3, Pages 5-11 and 5-12, Summary of Alternatives, and Table 10. This section assembles seven alternatives from the technologies and process options retained for further analysis. The list of alternatives in this section and in Table 10 should be revised in accordance with GC 7 through 13.

40. Table 11. This table lists applicable or relevant and appropriate requirements (ARAR) for the alternatives. The following corrections should be made to the table:

- Primary drinking water regulations (MCLs and nonzero maximum contaminant level goals [MCLG]) promulgated pursuant to the Safe Drinking Water Act should be identified as ARARs for all alternatives.
- The second state chemical-specific ARAR should apply to all alternatives, including no action.
- The fifth state chemical-specific ARAR should apply to all alternatives, including no action.
- The tenth federal action-specific ARAR is said to apply to three alternatives, but the equivalent state ARAR (POTW discharge regulations) is said not to apply because POTW discharge is not part of any alternative. The federal action-specific ARAR should be revised to be consistent with the equivalent state ARAR.
- This table should be revised in accordance with the new set of alternatives discussed in GCs 6 through 13.

41. Section 6.1.7, Page 6-8, Present Net Worth Discount Rate. The FS uses a 3 percent discount rate for the present net worth calculation. The RI/FS guidance recommends use of a 5 percent discount rate. Cost estimates should be revised using a 5 percent rate. This revision is necessary to more accurately estimate the final costs of the alternatives but does not affect the relative difference in the costs of the alternatives.

42. Section 6.2.1, Pages 6-9 and 6-10, No Action - Overall Protection. This section discusses how the no action alternative is protective of human health and the environment. If no action is protective, this FS is not necessary. However, no action may not be protective because the conditions at the landfill would deteriorate over time. Without proper landfill operation, maintenance, repair, and monitoring, (1) ground-

water contamination could increase or migrate further, (2) leachate generation would continue and increase as the cap erodes, and (3) the venting system may become inoperative. This section states that there is no evidence of off-site migration of landfill gas. This statement is misleading because off-site soil gas has not been monitored. This paragraph should be revised to address items in GC 1.

43. Section 6.2.2, Page 6-11, No Action - ARARs. This section fails to identify any ARARs for the no action alternative. At a minimum, ground-water cleanup levels (nonzero MCLGs and MCLs for carcinogens or more stringent state standards) are relevant and appropriate. In addition, the state minimum landfill capping requirements are applicable to the site. This section should be revised to address these ARARs.

44. Section 6.2.3, Pages 6-11 and 6-12, No Action - Long-Term Effectiveness. This section discusses the long-term effectiveness and permanence of no action. This section should address the potential for ground-water contamination to increase or migrate under the no action scenario. The long-term effectiveness of the existing passive landfill gas venting system in the absence of any maintenance or repair of the vents should also be discussed. Moreover, this section should be revised to explain future conditions if no action is taken and to explain that a 5-year review would need to be conducted if the no action alternative was selected. Finally, the text should state that the reliability of the no action alternative is not adequate because the no action alternative would not be monitored. Refer to GC 1.

45. Section 6.2.5, Page 6-13, No Action - Short-term Effectiveness. This section discusses the short-term effectiveness of the no action alternative. The text states that ground-water remedial action objectives are currently being met by this alternative. However, the ground-water remedial action objectives should be revised to address restoration of the aquifer. When this objective is added, the no action alternative will no longer meet the ground-water remedial action objectives. This section should be revised accordingly. Refer to GC 2.

46. Section 6.3 through Section 7. These sections of the FS evaluate the proposed alternatives. The evaluations should be rewritten for the new set of alternatives discussed in GCs 7 through 13.

47. Section 6.3, Page 6-15, Monitoring. This section should explain that natural attenuation and monitoring are the proposed remedial actions for ground water. This section should also explain how natural attenuation will be used to restore the quality of the aquifer and how this restoration will be measured. Finally, the contingencies in case contamination increases or migrates further should be explained. Refer to GCs 2 and 3.

48. Section 6.3.1, Page 6-17, Alternative 2 - Overall Protection. This section explains how Alternative 2 provides overall protection. The text refers to "sufficient" protection. Overall protection is a threshold criterion and is not measured in degrees; an alternative either is or is not protective. The way in which the alternative provides overall protection should be discussed in detail. The use of qualifying terms like "sufficient" should be deleted from the discussion. The text should also discuss the contingencies that will be in place in case monitoring indicates an increase in contaminant levels or migration and the monitoring triggers that will require initiation of the contingencies. Refer to GCs 3 and 5.

49. Section 6.3.2, Pages 6-18 and 6-19, Alternative 2 - Compliance With ARARs. This section discusses ARARs associated with Alternative 2. The ground-water ARAR discussion should be revised to discuss EPA's Ground-Water Protection Strategy classification system and how it applies to the site. Also, more information should be presented on the state ground-water classification system and the applicability of the

potable resource ground-water standards. Moreover, the FS and this ARAR discussion should be revised in accordance with GC 2. Finally, the statement that EPA MCLs are not ARARs because impacted ground water would not be used as a public drinking water supply is not correct. EPA MCLs (for carcinogens) and nonzero MCLGs (for noncarcinogens) are considered relevant and appropriate to this alternative. The discussion should be revised accordingly.

50. Section 6.3.3, Page 6-21, Alternative 2 - Long-Term Effectiveness. This section discusses the long-term effectiveness and permanence of Alternative 2. This section should be revised to discuss the reliability of the alternative in light of long-term monitoring and contingent actions.

51. Section 6.4, Page 6-25, Alternative 3. This section evaluates an active landfill gas extraction system. Any discussion of active landfill gas extraction and treatment should address condensate generation, collection, treatment, and disposal. This alternative should be revised in accordance with GCs 7 through 13. This section should be revised to evaluate the new Alternative 3.

52. Section 6.5, Page 6-37, Alternative 4. This section evaluates Alternative 4, which should be revised in accordance with GCs 7 through 13. This section should be revised to evaluate the new Alternative 4.

53. Section 6.5, Pages 6-37 and 6-38 Alternative 4. This section describes the proposed leachate extraction and treatment system. The proposed system should be described in more detail. The description should include all processes, flow rates, and treatment steps used to estimate the cost of the system. In addition, refer to GC 4 with regard to the leachate treatability study.

54. Section 6.5.2, Page 6-43, Alternative 4 - ARARs. This section discusses ARARs associated with Alternative 4. Refer to SC 49 with regard to federal MCLs and MCLGs as ARARs.

55. Section 6.5.2, Page 6-45, Alternative 4 - ARARs. This section discusses ARARs for Alternative 4. This section should also address the minimum state capping requirements as an ARAR.

56. Section 6.5.4, Page 6-48, Alternative 4 - Reductions in Toxicity, Mobility, and Volume. This section describes the reduction in toxicity, mobility, or volume of contaminants to be achieved by Alternative 4. This section misapplies the criteria to the extraction of leachate from the landfill. The criteria apply only to the reductions to be achieved through treatment, not those through recovery or containment. The discussion of increased mobility because of extraction should be deleted.

57. Section 6.5.6, Page 6-52, Alternative 4 - Implementability. This section discusses the implementability of Alternative 4. The discussion of permitting should be revised to state that on-site actions do not require state or federal permits and that only the substantive requirements of such permits need to be met.

58. Section 6.5.7, Page 6-53, Alternative 4 - Cost, and Tables C4a, b, and c. The assumptions used to estimate the cost of leachate extraction and treatment should be fully explained. Also, the type of leachate process system assumed should be described.

59. Section 6.6, Pages 6-56 and 6-57, Alternative 5. Alternative 5 is the new limited action alternative (the new Alternative 2). The ground-water discussion on these pages should be revised in accordance with GCs 2 and 3.

60. **Section 6.6.2, Pages 6-58, Alternative 5 - Ground-Water Quality ARARs.** This section addresses ground-water quality ARARs. The ARAR discussion on federal MCLs and nonzero MCLGs should be corrected according to SC 49.

61. **Section 6.6.2, Page 6-59, Alternative 5 - Landfill ARARs.** This section discusses landfill closure ARARs. The FS should state whether 35 IAC Part 807 or Part 814 applies. If Part 814 applies, then repair of the existing cap would not meet ARARs and should not be considered as a process option unless a waiver can be obtained.

62. **Section 6.6.3, Page 6-60, Alternative 5 - Long-Term Effectiveness.** This section discusses the long-term effectiveness and permanence of Alternative 5. The presumed decrease in leachate generation resulting from repair of the existing cap should be quantified using the HELP model.

63. **Section 6.6.3, Page 6-61, Alternative 5 - Adequacy and Reliability of Controls.** This section discusses the adequacy and reliability of cap repair. This section should also discuss the potential impact of leachate currently in the landfill on ground-water contamination.

64. **Section 6.6.5, Page 6-63, Alternative 5 - Time Until Objectives Are Reached.** This section discusses the short-term effectiveness of Alternative 5. The statement concerning ground-water remedial action objectives should be revised in accordance with SC 1.

65. **Section 6.6.6, Page 6-64, Alternative 5 - Administrative Feasibility.** This section describes the administrative feasibility of Alternative 5. The text should note that permits are not required for remedial actions conducted on-site and that only the substantive requirements of such permits need to be met.

66. **Sections 6.7 and 6.8, Pages 6-66 through 6-104.** These sections discuss Alternatives 6 and 7. Alternatives 6 and 7 do not discuss new process options or remedy components. Specific comments provided above for Alternatives 1 through 5 also apply to Alternatives 6 and 7.

67. **Section 6.7, Page 6-75, Alternative 6 - ARARs.** This section discusses the ARARs for Alternative 6. This discussion should include an explanation of 35 IAC Part 814, which is listed as possibly being relevant and appropriate.

68. **Section 6.7.4, Page 6-78, Alternative 6 - Reductions in Toxicity, Mobility, and Volume.** This section describes the reductions in toxicity, mobility, and volume of contaminants to be achieved by Alternative 6. This discussion should be revised in accordance with SC 31.

69. **Section 7.1, Pages 7-1 through 7-4, Overall Protectiveness.** This section discusses how each alternative protects human health and the environment. The discussion of future risk and ground-water remedial objectives should be revised in accordance with GCs 1 and 2.

70. **Section 7.1, Pages 7-1 through 7-4, Overall Protectiveness.** This section compares the relative performance of each alternative to each of the nine evaluation criteria. Thus this section addresses the criterion of overall protection of human health and the environment. This is a threshold criterion and is not measured in degrees; an alternative either is or is not protective. This section should be revised to explain whether or not each alternative provides overall protection. Refer to GC 5.

71. **Section 7.2, Pages 7-4 through 7-8, Compliance With ARARs.** This section describes how each alternative complies with ARARs. First, the discussion of the necessity for an

ARAR waiver should to be framed in terms of the ability of natural attenuation to restore ground water to acceptable levels. Second, natural attenuation should be compared to active restoration. Third, MCLs (for carcinogens) and nonzero MCLGs (for noncarcinogens) are relevant and appropriate and therefore should be considered ARARs.

72. Section 7.2, Page 7-8, ARARs. The discussion of MCLs should be revised in accordance with SC 49.

73. Section 7.2, Page 7-8, ARARs. This section discusses landfill capping ARARs. The minimum state capping requirement should be an ARAR for all alternatives. This section should be revised accordingly.

74. Section 7.3, Pages 7-8 through 7-11, Long-Term Effectiveness. This section compares the long-term effectiveness and permanence of the alternatives. This section should also discuss the potential need for replacement of the ground-water remedy (monitoring and natural attenuation).

75. Section 7.4.2, Page 7-12, Degree of Expected Reductions. This section compares the degrees of reduction in toxicity, mobility, or volume of contaminants that the alternatives achieve. The discussion regarding leachate should be revised to refer only to treatment of the leachate and not recovery of the leachate.

76. Section 7.5.4, Page 7-15, Time Until Objectives Are Reached. This section discusses how long each alternative will take to achieve the remedial objectives. The discussion on ground water should be revised in accordance with GC 2.

77. Section 7.6.2, Pages 7-16 and 7-17, Administrative Feasibility. This section compares the administrative feasibility of the alternatives. The discussion regarding permits should be revised in accordance with SC 65.

78. Section 7.7, Cost. This section lists the capital, operation and maintenance, and present worth costs of the alternatives. A table should be provided to summarize the costs of the alternatives in order to allow easier comparison.